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14. ABSTRACT A research consortium including Windber Research Institute (WRI), the US Army Space and Missile Defense Command (USASMD), the Joyce Murtha Breast Cancer Care Center (JMBCC), and the Clinical Breast Care Project (CBCP) Walter Reed Army Medical Center (WRAMC) has been formed to evaluate the use of minimally-invasive methods for screening including mammography, ultrasound, proteomics and genomics, in the serum and breast for early detection of markers for risk of disease or early presence of disease and the facilitate early intervention in medical treatment or lifestyle. The approach focuses on the continuing development/aging that the female breast undergoes through life and its potential sensitivity to environmental and lifestyle factors, particularly as they interact with specific genetic factors.				
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**Advanced Processing for Biomedical Informatics (APBI)  
Annual Report**

**1. INTRODUCTION:**

This effort involves a research consortium which includes Windber Research Institute (WRI), the US Space and Missile Defense Command (USASMDC), The Joyce Murtha Breast Care Center (JMBCC) and The Clinical Breast Care Project (CBCP) Walter Reed Army Medical Center (WRAMC). The objective is to establish a Decision Support System (DSS) for early detection and prediction of risk of breast disease in women based on SMDC's Missile Defense Decision Architecture which integrates mammography, ultrasound, proteomics, genomics, environmental and lifestyle data.

**2. BODY:**

- Grant of \$443,620.00 was awarded September 26, 2006.
- The subprotocol was submitted to the WRAMC Department of Clinical Investigation (DCI) on 1 October 2006.
- The subprotocol was presented and defended at the Clinical Investigation Committee 3 January 2007.
- Initial DCI approval was given on 16 January 2007 pending revisions.
- Sub award Agreement to Windber Research Institute (WRI) on 17 April 2007.
- Full DCI approval was received on 7 July 2007 and the subprotocol was forwarded to MRMC.
- WRI received approval from their IRB and the subprotocol was submitted to MRMC in July 2007.
- 30 October 2007 a one year no cost extension was awarded.
- 2 October 2008 a second one year no cost extension was awarded extending the period of performance for research to 26 September 2009.

Task 1: Establish research and administrative support.

Develop and implement the required administrative, personnel and programmatic support to maintain research support and project management through the end of the funding period.

Completed. Administrative and programmatic personnel provided support for the project throughout the funding period.

Task 2: Establish a collaborative research consortium between the Clinical Breast Care Project, Walter Reed Army Medical Center, the Windber Research Institute, the US Army Space and Missile Defense Command and the Joyce Murtha Breast Care Center.

Completed. A sub award agreement established with Windber Research Institute on 17 April 2007.

Task 3: Provide the following specific performance tasks to demonstrate the feasibility of performing disease risk assessments for early detection and prediction of risk of disease of women

The project has made great progress in the past year towards completing the project objectives.

Progress to date has included that the Walter Reed Army Medical Center Comprehensive Breast Center has submitted 57 digitized images from qualified consented patients to Space Missile Defense Command (SMDC). Windber Research Institute (WRI) has submitted corresponding data, to include clinical questionnaires and pathology checklists. SMDC created comparison surveys of questionnaire data and compiled algorithms from submitted images. Currently, WRI is in the process of identifying whole blood samples in PAXGene tubes from these subjects for gene expression analysis. The analysis process is expected to take several months to complete. Upon completion, the data will be supplied to SMDC for further analysis.

All of the project participants, WRI, SMDC and WRAMC held a meeting in August to review the progress of the project. It was determined that the results of the studies to date are positive but additional research was needed, and a no-cost extension request was submitted and awarded. SMDC determined that they would need to increase the number of data sets (mammograms) in order to pursue further testing. Additional images were recently acquired by SMDC and the project will use the additional one year to process and further refine the algorithms that will possibly utilize SMDC technology to detect breast cancer in its early stages in mammographic images. SMDC is working to refine the algorithms that will be applied to the additional ultrasound and digitized data sets.

Articles on the potential of this collaboration have been published in the Army newspaper STRIPE and in the Henry M. Jackson Foundation newsletter and annual report. The collaboration was shared at a recent meeting of military and civilian physicians sponsored by the Jackson Foundation and the Principal Investigator has been asked to prepare an article for publication on the potential of this collaboration.

Task 4: Establish conceptual development of Decision Support System for the early detection of prediction of risk of disease in women. Based on hierarchy of clinical significance from outcomes in Task 3, create the architecture and demonstrate the feasibility of performing disease risk assessments of women by integrating multidisciplinary analysis and data in the patient based diagnostic Decision Support System.

Development of the Decision Support System will take place after Task 3 has been completed.

### **3. KEY RESEARCH ACCOMPLISHMENTS:**

No key research accomplishments to report at this time.

### **4. REPORTABLE OUTCOMES:**

There are no reportable outcomes at this time.

### **5. CONCLUSIONS:**

Not applicable at this time

### **6. REFERENCES:**

Not applicable at this time.

### **7. APPENDICES:**

There are no appendices at this time.